

# The Odonata of N. Angola

## Part II

This is the continuation of the study of the large collection of Odonata belonging to the Dundo Museum, Lunda, Angola. Through the courtesy of the Companhia de Diamantes de Angola, and of Dr. ANTÓNIO DE BARROS MACHADO, I have now completed the work published here.

In this Part II, I have described three new species and one new subspecies from Angola, and in addition I have here described two new species and one sub-species from Nigeria. As Col. F. C. FRASER was revising the genus *Phyllogomphus* SELYS, at the same time, I submitted him two new species from Dundo, Angola, which he has named in the *Rev. Zool. Bot. Afric.* (1957, LVI: 24-29). All the types are in the British Museum (Natural History).

There have now been three papers devoted to the Odonata of Angola, based on three major collections<sup>(1)</sup>, and many additional specimens<sup>(2)</sup> from collections in London, Paris, Brussels, Frankfurt and elsewhere. In very few cases has the collector been a student of the Order and the results cannot yet reflect more than a proportion of the species likely to inhabit the country. However, some interesting facts can already be shown, and 17 new species have been described out of a total, so far, of 113 species.

The latest of the collections — those from Dundo, Lunda District in the north-east of Angola — shows the usual scarcity of the genera Gomphidae and Aeshnidae to be found in collections. The members of both families being difficult to capture. There are, also, very few specimens of most of the Zygoptera and many of the Libellulidae are poorly represented. However, the following species evidently swarmed at certain seasons: *Pseudagrion kersteni*, *Trithemis arteriosa*, *T. monardi*, *T. dichroa*, *Palpopleura lucia* and *P. portia*, *Brachythemis leucosticta*, *Orithelrum guineense*, *O. microstigma* and *O. abbotti*.

Certain species, as far as the present knowledge goes, tend to replace each other in North and South Angola, although conditions of territory or habitat seem generally very similar. It is possible that the presence of certain species only in the South, reflects their advance up the west coast from more open southern Africa, whereas the forested central Africa may have barred the progress of some species into the North-East of Angola.

*Pseudagrion salisburyense* was not taken at Dundo, but was abundant in S. Angola. *Ps. angolense* swarmed in S. Angola, but was missing at Dundo. *Ps. inconspicuum*, very common in the south, was not taken at Dundo. *Ps. monardi*, described from Ebanga, has been taken again at Ongueria, both in the south. No *Enallagma* species were in the Dundo collection. It is now quite certain that *E. fractum* RIS, reported from Angola, is a synonym of *E. elongatum* MARTIN. *Agriocnemis angolense*, that swarmed in South Angola, is absent from this North Angolan collection, as is also *Chlorocypha croceus*, common in the south.

<sup>(1)</sup> RIS, F. 1931, Odonata aus Sud-Angola, *Rev. Suisse Zool.*, 38:97-112. LONGFIELD, C. 1947, The Odonata of South Angola, *Afr. Mus. Basage* (1945), 16:1-31. LONGFIELD, C. 1955, The Odonata of N. Angola, Part. I, *Publ. Cult. et. Diamant. Angola*, 27:11-64.

<sup>(2)</sup> RIS, F. 1909-1919, *Cat. Coll. Libell.*, 10-16. LONGFIELD, C. 1936, Studies on African Odonata, *Trans. R. ent. Soc. Lond.*, 85:498.

T A B L E I  
Colour pattern of males

<i>Pseudagrion</i> of <i>angolense</i> group	Pale dorsal colours on Head	Postclypeus dark or pale	Labrum	Anehumeral stripes entire or interrupted	Anehumeral stripes wide or narrow	Anehumeral stripes. Colour	Black laterally on thorax (posterior to) (humeral suture)	Remarks
<i>angolense</i> SELYS 1876	orange	dark	pale or dark in part	entire	narrow	orange	short oblique stripe mesepimeron, long stripe 2nd lateral suture	colour of labrum variable in both sexes
<i>kibalense</i> LONGFIELD 1959	green or blue	dark	pale or dark in part	entire	wide	sage-green or blue	very short fine line 1st lateral suture, short straight or long stripe 2nd lateral suture	colour of labrum variable in both sexes. Lateral black stripe lengthens with age
<i>melanicterum</i> SELYS 1876	green or blue	dark	pale	entire	narrow	sage-green or blue	short streak and dot 1st lateral suture, long stripe 2nd lateral suture	
<i>serrulatum</i> KARSCH 1894	orange-yellow	dark	pale or dark in part	entire	wide	orange-yellow	short streak with dot (comma) 1st lateral suture; short straight stripe 2nd lateral suture	colour of labrum probably darkens with age
<i>makabusiense</i> PINHEY 1950	bluish	dark	wholly dark	entire	narrow	green	short broad stripe 1st lateral suture, long stripe 2nd lateral suture	Head almost entirely black above, except postocular spots and connecting line
<i>epiphonematicum</i> KARSCH 1891	yellow	pale	pale	interrupted	narrow	yellow	dot 1st lateral suture, long narrow stripe 2nd lateral suture	
<i>coeruleiceps</i> LONGFIELD 1959	blue	pale	pale	entire	narrow	blue	short oblique stripe mesepimeron, long stripe 2nd lateral suture	Postclypeus has narrow black basal line in male, large blk spots female

*Crocothemis erythraea*, swarming in the south, was not taken at Dundo, but *C. sanguinolenta* was common in both parts. *Trithemis arteriosa* and *T. monardi* seem to be equally abundant north and south, but *T. pluvialis* and *T. stictica*, both very common in the south, were not included in the northern collection, whereas *T. dichroa* was not taken in the south. *Brachythemis leucosticta*, which normally overwhelms any African collection, was not taken at Dundo, although forty-one specimens were included from Donguena in S. W. Angola.

The species of the genus *Orthetrum* have been discussed in Part I<sup>(1)</sup>, however, *O. caffrum*, which had been the commonest in all the collections from S. Angola, is not included in the one from Dundo. *O. guineense* was extremely abundant from both parts, but *O. microstigma* and *O. abbotti*, both nearly as abundant in the northern collection as *O. guineense*, were both scarce or absent from the south of the country. *O. falsum falsum*<sup>(2)</sup> has only been taken in the south. The next nearest habitats, that I know of, are the Central Congo and Uganda. In West Africa it is replaced by *O. julia*.

Other species are discussed in more detail in the systematic list that follows.

### SYSTEMATIC LIST

In this part I have both discussed, and described, a few species from other parts of Africa, arising from my Angolan studies. The species occurring in Angola are numbered, and an asterisk (\*) denotes a new record for Angola.

#### \* I. *Pseudagrion melanicterum* Selys

A Central and West African forest species belonging to the "angolense group" and discussed below. It had not been previously recorded from Angola. A few were taken at Dundo.

#### *Pseudagrion angolense* Group

This comprises: *Ps. angolense* SELYS, 1876, *Ps. melanicterum* SELYS, 1876, *Ps. epiphonematicum* KARSCH, 1891, *Ps. serrulatum* KARSCH, 1894, *Ps. makabusiense* PINHEY, 1950, *Ps. kibalense* sp. n. and *Ps. coeruleiceps* sp. n. (see Tables 1-3).

The length given for the individuals varies, naturally most in the species the most common in collections, and it would seem useless to give these as a specific character. All in the group range from 28-39 mm. The penis of *melanicterum*, *epiphonematicum* and *serrulatum* was illustrated by E. SCHMIDT in 1951 (*Arq. Mus. Bocage* (1949) 20 : 138) and *makabusiense* by E. PINHEY in 1951 (*Dragonflies of S. Africa*, page 79). The penis of the other three species in the group, I illustrate here. (Figs. 1. G & 3. F-G).

*Ps. angolense* is probably the commonest and most widespread of them all. It is found in Tanganyika, Kenya, Uganda, Congo, S. Angola (the type locality) and most of the West African countries. It is distinguished by its entirely orange coloured head markings.

*Ps. epiphonematicum* has all the pale colouring on the head of a clear bright yellow. I have now seen a male and female from the Cameroons, where the type came from, and it

(1) LONGFIELD, C. 1955. The Odonata of N. Angola. *Publ. Cult. cia. Diamant, Angola*, 27:11-64.

(2) *Orthetrum capense* was shown by KIMMINS to be a homonym of *Libellula capensis* LINNAEUS, 1767, a Myrmeleonid, and the name of *O. capense falsum* LONGFIELD (1955), is replaced by that of *O. falsum falsum* (*Entomologist*, 1957, 90:95).

T A B L E I I  
Shape of male genitalia

Pseudagrion of angolense group	Superior appendages viewed from the side			Superior appendage viewed obliquely from above		Penis	
	Names	Shape of sup. appen.	Shape of Upper fork	Shape of Lower fork	Length of upper fork in proportion to lower fork		Interior teeth or points
<i>angolense</i> SELYS 1876	narrow fork	narrow fork	narrow hooked	broad rounded	longer	One acute point base lower half	straight ends
<i>kibalense</i> LONGFIELD 1959	narrow fork	narrow fork	narrow hooked	broad rounded	almost equal, upper slightly longer	One acute point base lower half	sloped ends
<i>melanicterum</i> SELYS 1876	very wide fork	very wide fork	narrowish hooked	slightly broader than upper fork, not very rounded	about equal	Two points or teeth, one at base of each half	slightly sloped ends
<i>serrulatum</i> KARSCH 1894	narrow fork	narrow fork	narrow hooked	broad rounded	almost equal, upper slightly shorter and blunter	none	quite rounded ends
<i>mababustense</i> PINHEY 1950	widish fork	widish fork	narrowish hooked	moderately broad, not very rounded	longer	Two teeth, one on base of each half	straight ends
<i>epiphonematicum</i> KARSCH 1891	wide, but uneven fork	wide, but uneven fork	very narrow, hooked	very stout, rounded	shorter	none	very sloped ends
<i>coeruleiceps</i> LONGFIELD 1959	very wide-shallow fork	very wide-shallow fork	moderately broad hooked	broad rounded	shorter	one tooth or hook upturned, base lower half	sloped ends

is unmistakable. The male has very narrow, interrupted, yellow antehumeral stripes and the insect is a very slender one. It is possibly confined to the Cameroons. Other specimens named as this species, may not have been correctly identified. This is certainly the case with the two males and two females I took in Uganda in 1934 and described as *Ps. epiphonematicum* (*Trans. R. ent. Soc. Lond.*, 85 : 473). They had light blue head markings and broad blue antehumeral stripes and I now name them as a new species, *Ps. kibalense* (see below). I took a longer series in Uganda, in Kibale Forest, in the winter of 1937-38. At first I was inclined to think they might be a subspecies of *Ps. serrulatum* KARSCH, described from one male — probably only semi-adult — taken in the Cameroons. However, R. M. GAMBLES has a male he captured at River Okhi, in southern Nigeria, which is *Ps. serrulatum* by the penis (unique in the group), as well as the other characters, and has broad orange-yellow antehumeral stripes. It is exceedingly close to *epiphonematicum* in anal appendages, but is not this species, nor is it the same as *kibalense*. *Ps. serrulatum* is a large, stout species with strongly toothed segment-borders to the 8th and 9th abdominal segments (there are no strong teeth on those of *kibalense*). The pterostigma is light yellow-grey in *serrulatum*, very dark brown to black, with a pale surround, in *kibalense*. In *serrulatum* the posterior half of the dorsum of abdominal segment 8 is black, as is also the 9th segment, being similar to *epiphonematicum*. In *kibalense* all the dorsal surface of 8 is blue, and there is only a narrow lateral black stripe just above the lateral carina. Segment 9 has narrower black both laterally and dorsally, than that of *serrulatum* and *epiphonematicum*. In *melanicterum* and *coeruleiceps* there is a narrow posterior blue dorsal band on segment 8, which is black in the others. Segment 10 is black in all, except *coeruleiceps*, where it is all blue (except for being narrowly black along the lateral carina). All the species have pale basal rings to all, or nearly all, of the abdominal segments 1-7, which vary in width and also whether they completely encompass the segment, or are divided dorsally. However, I do not consider these reliable specific characters.

In some of the species, if not in all, the labrum darkens with age. In both *melanicterum* and *kibalense* the males spend more than a month with the head and thoracic dorsal stripes of a dull sage-green colour, which turns a bright sky-blue six weeks later. It is certain that those species with orange head markings, do not become either blue or green at any other stage. The green ones may, and probably do, become blue as they age, but there are sufficient structural, and other differences of pattern, to name the insects discussed here as species and not as colour-forms. They might possibly be subspecies, but then the overlapping distribution has to be accounted for.

*Pseudagrion coeruleiceps* sp. n.

Five males and one female collected by R. M. GAMBLES on the Plateau, round Bukuru, Northern Nigeria, in March and September 1956. Type male and allotype female were taken in the Stock Farm at Vom, 7.9.1956, while 2 male paratypes were taken in the Sacred Grove at Vom, 22.3.1956, and 2 male paratypes at Kurn, 2.9.1956. The types and 2 paratypes have been given by the collector to the British Museum (Natural History).

Type ♂: — Head anteriorly all sky-blue to, and including, the bases of the antennae, except for a narrow black basal line to the clypeus. The moderately broad black band across the epicranium is extremely straight in outline. Two, large sky-blue pear-shaped postocular spots are joined by a narrow blue line. The rear and underneath of the head is pale cream, except for the interior cavity (occipital foramen) which is black.

Prothorax black with sky-blue anterior lobe, a round blue spot on either side of dorsum of median lobe, and blue outer edge laterally.

Thorax mostly black on the mesepisternum and ending below the humeral suture with a very straight edge. Two narrow, but entire, sky-blue antehumeral stripes, and blue spots

T A B L E I I I  
Structural characters of females

Pseudogenitor of <i>angolense</i> group	Stylets on Prothorax		Prothorax lobes		Mesinfraepisternum		Mesostigmal lamina
	Short or long	Length in proportion to width of mid prothoracic lobe	Colour	Prevailing colour of dorsum of mid & posterior lobes. (All have yellow laterally)	Shape of "shoulder" projections	Colour of projections	Shape
<i>angolense</i> SELYS 1876	long	about one half	orange, tipped black	strongly marked with pale	small projecting "wings"	black	raised all over, and yellow
<i>hibalense</i> LONGFIELD 1959	long	less than half	yellow	black	lumpy, but less inflated than <i>melanicterum</i>	blue above, black posteriorly	raised yellow wings to lamina
<i>melanicterum</i> SELYS 1876	long	about two-thirds	yellow, tipped brown	black	large and globular lumps	blue above, black posteriorly	no projecting lamina
<i>serrulatum</i> unknown							
<i>makabusiense</i> PINHEY 1950	long	At least one-third	yellowish	black	?	?	?
<i>epiphonematicum</i> KATTSCH 1891	short	minute knobs	black	strongly marked with pale	High, narrow projecting "wings"	black	no projecting lamina
<i>coeruleiceps</i> LONGFIELD 1959	long	about two-thirds	yellow, tipped black	strongly marked with pale	none	—	raised yellow wings to lamina

between the wings. The rest of the thorax laterally is blue, with the following black markings: a short narrow stripe, curved obliquely across the mesepimeron, from where it joins the black of the mesepisternum at the alar sinus, to where it joins the black of the 2nd lateral suture just above the metastigma; along the 2nd lateral suture is a very straight narrow stripe, the full length of the thorax, reaching from the wing to the mid-leg coxa. On the thoracic sternum are several black smudgy marks. The leg is largely sky-blue, with only a very narrow black streak exteriorly along trochanter, femur and tibia. Tarsi are orange, barred with black, and black tips to claws.

The entire abdomen dorsally, from 1-7 segments inclusive, has a deep bottle-green sheen on a black ground; the black elsewhere being much more matt. Dorsally on segment one, there is a narrow sky-blue posterior basal ring; seg. 2 has no blue ring, and segs 3-7 have a narrow sky-blue anterior basal ring. All the dorsal, and most of the lateral surface of segs. 8-9 is cobalt-blue, with black along the lower edge laterally. Seg. 10, and the outer side of the anal appendages, is black, and the inner surfaces sky-blue, with only a very narrow black streak exteriorly along trochanter, femur and tibia. Tarsi are orange, barred with black, and black tips to claws.

Wings hyaline. Pterostigma dark grey to black, with a pale surround. Measurements: Abdomen 32 mm. Hw. 22 mm.

Four male paratypes, in the series, have almost identical markings. In one only, the black oblique stripe laterally on the thorax, does not join up with the black along the 2nd lateral suture. Measurements: Abdomen 31-32 mm. Hw. 22 mm.

The hollowed out anal appendages are yellow, or pruinose blue interiorly. The superior appendage has a wide shallow fork. The upper branch is curved over at the top into a moderately acute hook, but the base is without any interior tooth, or angular point. The lower branch is much wider and rounder, and slightly longer, than the upper branch, also this lower half has an internal basal spine-like hook, curved upwards and back towards the body. (See Fig. 3. D-H).

Allotype ♀: — All the light colours are pale yellow to pale blue, the latter strongest in the postocular spots, antehumeral stripes and the posterior abdominal segments. Very similar to the male in all markings, with the following differences: postclypeus mostly black; prothorax with long, narrow yellow stylets and the two pale spots enlarged and wedge-shaped; the black lateral thoracic stripes almost absent and replaced by a short club-shaped black mark down the 1st lateral suture, and two small black dots on the 2nd lateral suture; no black beneath the thorax and that on the legs reduced. The pale basal rings on 3-5 abdominal segments, are interrupted on the centre dorsum; no basal rings on 6-7 segs.; only a narrow, complete posterior basal ring on the black segment 8; 9-10 nearly all blue, a fine anterior black ring on 9, with a lateral extension towards 10. The short conical cerci are black.

The species is like *angolense* in thoracic pattern, being the only other species in the group to have the oblique black stripe, linking the 1st to the 2nd lateral suture. It has, however, the straight-sided black lateral stripe of *hibalense* and *epiphonematicum*, on the 2nd lateral suture (that of *angolense* is considerably curved). In some ways it is most like *epiphonematicum*, but the acute up-turned tooth at the base, interiorly, of the superior appendage, as well as the very blue colouring, decidedly differentiates it from the toothless and yellow coloured *epiphonematicum*. In the female, the greatest difference lies in the "shoulder" region of the thorax — with a complete absence of raised projections on the mesinfraepisternum of *coeruleiceps*.

One of the interesting results of this study, is the fact of the large differences between the females of the species, in the shape of these projections, when present, and the speculation as to what they can be there for. The prothoracic stylets and the mesostigmal laminae of the females, together with the forks and hooks of the male superior appendages, are evidently modified to fit securely together in copulation. But the female "shoulder" projections are surely too far back and too wide apart, to take any part in this performance?

\* 2. *Pseudagrion kibalense* sp. n.

(Fig. 1)

Also a member of the «angolense» group, with much the same distribution as *melanicterum*, but probably more local. For comparisons see Tables I, II, III. Two males and two females were first taken by me in the Buzirasagama portion of the Kibale Forest, Toro District, Uganda in 2.3.1934, and named *Ps. epiphonematicum* KARSCH (Trans. R. ent. Soc. Lond., 1936, 85 : 473 and 495). In 1937-38 (December and January), I took ten males and one female in Kibale Forest and I then considered, as stated above, that I had misidentified the species. On Tables I and II, it will be seen how it differs in both colour and pattern from *angolense*, *epiphonematicum*, *coeruleiceps* and *makabusiense*; in colour from *serrulatum*; in dorsal pattern from *melanicterum*. It is fairly close to *angolense* in the male and the three best characters are: pale colours on head, green or blue (*angolense* orange), antehumerals wide (*angolense* narrow), no oblique black stripe laterally on thorax (oblique in *angolense* and *coeruleiceps*). From *melanicterum* it is not easy to tell, where the colours and lateral thoracic pattern are nearly identical.

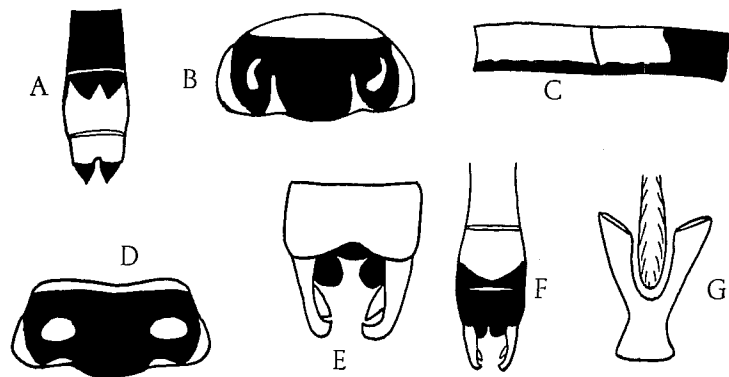


Fig. 1 — *Pseudagrion kibalense* sp. n. A., ♀ abdominal segments 8-10. B., ♂ prothorax. C., ♂ abdominal segments 8-10 from the side. D., ♂ prothorax. E., ♂ anal appendages from above. F., ♂ abdominal segs. 8-10 from above. The black dorsal pattern on 9 is sometimes absent. G., ♂ penis end.

The best characters are: the wide antehumerals; narrowly divided fork of the superior appendage, with only one acute internal point; and the blue on the frons, extending back as far as the median ocellus. *Ps. melanicterum* is a blacker insect, and has a wide, almost evenly divided fork to the superior appendage, with two internal points, or teeth. The female of *kibalense* most closely resembles that of *melanicterum* and almost needs a female of the latter species to compare it with, before the differences are apparent: smaller lumpy «shoulder» projections; shorter stylets, with no dark tips; distinctly raised yellow «wings» to the mesostigmal lamina (in *melanicterum* the lamina does not project at all). In both sexes *melanicterum* has an extra blue area dorsally on the posterior end of the abdominal segments: 7 in the male, 8 in the female. Both species would appear to be rare in Angola, but both were taken at Dundo (2 males of *kibalense*).

Type ♂: 21.1.1938, Kibale Forest, Toro Dist., Uganda. Adult, with all light parts cream beneath and sky-blue above. Head anteriorly mostly sky-blue, including the bases of the

antennae. Postclypeus and the narrowish band across the epicranium, black, the latter reaching nearly to the rear of the head, where a very blue line joins together the large, roundish blue postocular spots. The rear and the underneath of the head cream, except for the black interior cavity (occipital foramen).

Prothorax black, with wide blue anterior lobe, two large roundish blue spots on either side of the dorsum of the median lobe, wide blue outer posterior edge to the prothorax, and a small blue patch either side of the upturned edge of the posterior lobe (just in the similar position where each female stylet is based).

Thorax is less black dorsally, than any in the «angolense» group, except *serrulatum*, because of the two wide, entire, blue antehumeral stripes. The black of the mesepisternum ends with a somewhat straight edge, above the 1st lateral suture. Blue laterally, with the following black: an exceedingly short, fine, streak on the 1st lateral suture; a straight stripe on the 2nd lateral suture, reaching from the wing base to the level of the stigma, and continuing onto the hind coxa. Beneath bluish cream. Legs mostly black, but each femora is broadly blue on the inside.

The entire abdomen dorsally, from 1-7 segments inclusive, is a bronzy black. Sides of 1-2 and anterior base of 2, sky-blue, also a very narrow sky-blue dorsal ring anteriorly on 3-7. Segs. 8-9 pruinose blue, with a narrow wavy-edged stripe of black, low down on both segments and forming a narrow dorsal band posteriorly on 9. All of 10 seg. black. Beneath yellowish, with a black tergum.

Wings very slightly yellow. Pterostigma black, with a pale narrow surround. Measurements: Abd. 34 mm. Hw. 24 mm.

The two male paratypes taken in the type locality in March 1934, are as blue, or bluer, than the type, but those taken in December 1937, have all the dorsal areas of a sage-green colour (noted down while alive). The black stripe along the 2nd lateral suture varies in length, in some paratypes it reaches no further than the stigma. In all, it is of the same straight-sided shape. Measurements: Abd. 32-36 mm. Hw. 22-24 mm.

Allotype ♀: — Taken *in cop.* with male type (21.1.1938). Head: labium, mandibles, genae and rear of head pale yellow; labrum yellowish brown outlined in black; postclypeus black; anteclypeus and frons bluish, the latter to just behind the antennae, which have yellow bases; epicranium black to a narrow yellow line along edge of occiput, but enclosing two oval blue postocular spots.

Prothorax: a wide yellow anterior lobe, which has no yellow extension back to the median lobe (as in *epiphonematicum*); the yellow mark on the centre dorsum of each mid lobe, is almost a crescent in shape; the centre of the posterior lobe is all black, but the narrow yellow stylets flanking it, have yellow bases; laterally the prothorax is bluish.

Thorax: marked like the male, but with the black on the 2nd lateral suture ending well above the level of the stigma; the black stripe along the humeral suture is narrower than the blue antehumeral stripe, but widens slightly on the «shoulder» and tapers slightly towards the wings; the «shoulder» projections on the mesinfraepisternum, are inside the blue antehumeral stripe; the raised yellow «wings» of the mesostigmal lamina, lie just dorsally to these projections. Legs: yellow, the black reduced to the exterior lower half of the femorae, the exterior of the fore tibiae, and the tarsi of all pairs; claws brown.

Abdomen: bronze-black as in the male, and blue laterally on 1-2 segments, with narrow anterior basal rings on 3-8. On 1 and 8 there is also a narrow posterior basal ring, much less conspicuous on 1, than in the male, while 8, in the female, is largely black. 9-10 are mostly blue. There are four black conical marks on 9, beginning from the anterior end: one «cone» laterally on either side, stretches for two-thirds of the length of the segment, and a pair of «cones» dorsally for one-third of the segment. The black cerci are pointed and very short.

The wings in this single female are quite hyaline, and the pterostigma is a light brown, with a cream surround. Measurements: Abd. 34 mm. Hw. 24 mm.

### 3. *Pseudagrion kersteni* Gerstaecker

A common species in most of Africa. It is distinct, except from *Ps. salisburyense*, by the stout black stripes on the pruinose cobalt-blue thorax. In the males, the long angular superior appendages are unmistakable.

### 4. *Pseudagrion monardi* Longfield

Described from six males and one female taken November 1932 at Ebanga, in the Benguela region<sup>(1)</sup>. Now three males have been added from Ongueria, further to the south. These were taken at the end of September, 1949, but the 8-9 abdominal segments were just as discoloured, although I still think it likely that they are blue in life. The dorsum of segment 10 is definitely black. This would seem to be a species that easily discolours after death.

### \* 5. *Pseudagrion dundoense* sp. n.

(Fig. 2)

Holotype, a solitary male, taken at Dundo, Lunda District, N. E. Angola, March 1949. It is an orange and greenish ochre insect, with much black dorsally on the abdomen, similar to the average female, and might easily be taken for an *Enallagma*. However, it conforms better, both in venation and structure, to the genus *Pseudagrion*, and joins the small number of species with the facies of an *Enallagma*. In pattern it resembles *Ps. nubicum* the closest, with very similar thoracic markings, and somewhat similar abdominal markings, the principal differences being in the dorsal pattern of the 2 and 8-9 segments. The colours of the preserved specimen show no sign of blue, except on the 8-9 segs. The shape of the anal appendages and the penis are different, and it is considerably longer than *nubicum*. Other differences are: the colour of *dundoense* is orange and greenish-yellow; it has wider black stripes dorsally and laterally on the thorax; there are no twin pale spots on the centre lobe of the prothorax; there is no U mark on the second abdominal segment, and there is more black on the 8-9; there is no deep cleft in the superior anal appendage, which is very visible in the side view of *nubicum*.

Head: beneath yellow-cream, except for a black cavity (occipital foramen); labrum and genae orange, with a small black centre spot on labrum; anteclypeus and postclypeus greenish ochre, with three black spots on postclypeus; frons and the anterior half of the epicranium, greenish ochre, curved in front of the anterior ocellus and including the bases of the antennae (Fig. 2.A); the posterior half of the epicranium black, but enclosing two narrow wedge-shaped greenish ochre postocular spots, just not joined across the occiput by a narrow greenish ochre line.

Prothorax yellow laterally and black dorsally, with the following yellow markings: the anterior lobe, two small spots either side of centre lobe and the raised centre of the posterior lobe.

Thorax mostly greenish ochre, with a little whitish pruinose beneath. The antehumeral stripes are probably orange in life. They constrict sharply. The dorsal pattern is of three black

stripes: a centre and two humeral; while laterally there are two short black stripes (Fig. 2. C.). Legs yellow, black exteriorly on the femorae, pruinosed interiorly. The tibiae and tarsi have black spines and a few black marks on each joint.

Abdomen greenish ochre on 1-7 and 10 segments. Sternites black. Black dorsal pattern as in Fig. 2. B. The only blue is basally on segments 8-9, which are somewhat pruinosed. The anal appendages are as in Fig. 2. E-G. The superiors have a short, sharp hook turned completely

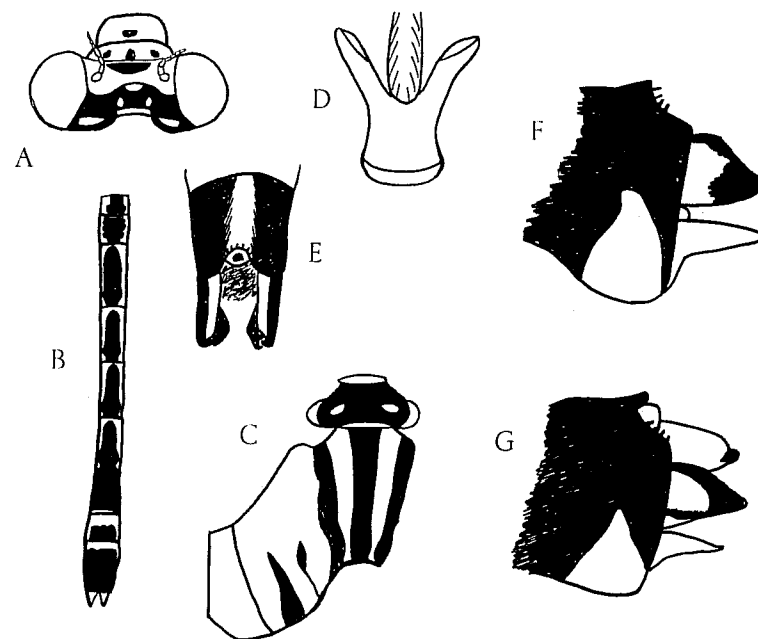


Fig. 2 — Type ♂ *Pseudagrion dundoense* sp. n. A., Head. B., Abdomen. C., Thorax. D., Penis end. E., Anal appendages from above. F., Anal appendages from the side. G., Anal appendages half right.

backwards, and the minute cleft between the hook and the appendage, can only be seen from behind and not from either above or the side views. The penis is quite unlike the rounded flangeless one of *nubicum*, but closely resembles that of *kersteni* and *spernatum* (Fig. 2. D.).

Wings hyaline, venation and pterostigma light brown. Measurements: Abd. 31 mm. Hw. 21 mm.

### 6. *Ceriagrion glabrum* Burmeister

A very common and widespread African species.

(1) LONGFIELD, C. 1947, The Odonata of South Angola, *Arq. Mus. Bocage* (1945), 16:12-15.

\* 7. *Ceriagrion platystigma* Fraser

One female from the Luembe River east of Dundo. It has not been previously recorded for Angola, but was first described from Uganda. Since then it has been taken in several localities in the Belgian Congo and in Nigeria and the Cameroons, as well as in E. and S. Africa.

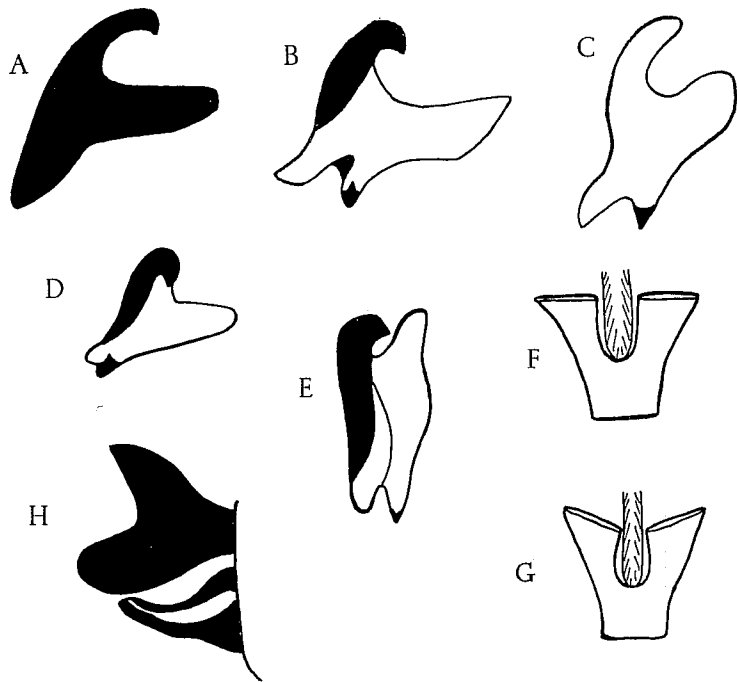


Fig. 3 — Upper branch of anal appendages (♂) viewed from within: — A., *Pseudagrion epiphonematum*. B., *Ps. melanicterum*. C., *Ps. hibalense*. D., *Ps. coeruleiceps*. E., *Ps. angolense*. Penis end: — F., *Ps. angolense*. G., *Ps. coeruleiceps*. H., Anal appendages of *Ps. coeruleiceps* from the side.

8. *Elattoneura (Disparoneura) simba* (Martin)

Three males and one female were taken in Dundo. Previously only from S. Angola. The genus never seems to be plentiful in collections. *E. simba* is known from the Belgian Congo and E. Africa.

9. *Platycypha (Chlorocypha) caligata caligata* (Selys)

Two males and three females of the common, and nominate form, of this species, were taken at Dundo in the months of January, March and April. Previously it had been taken in S. Angola between May and November. All the specimens were typical of this brilliant and beautiful species.

\* 10. *Platycypha caligata angolense* subsp. n.

Holotype and solitary male from Ongueria, S. W. Angola, in the Região de Sá da Bandeira, 25.9.1949.

Head: The swollen and prominent epistome is glossy and crimson-red beneath, velvety and chocolate-brown above. Labium and mandibles orange-brown, with black tips to the mandibles and maxillae. Labrum shiny crimson-red in the centre of the lower half, bordered by a shiny black line, and all the upper half shiny black. Anteclypeus glossy crimson-red narrowly edged in black and with a large black spot on the lower centre. Postclypeus chocolate-brown, and the same colour for two large spots on the frons, anterior to the antennae. Two small spots in front of the anterior ocellus, the scapes of the antennae; two small elongated marks at the edge of eyes (level with lateral ocelli); two large oval postocular spots; the entire occipital region and the rear of epicranium (posterior to ocelli); all yellow-green, the rest of the head, velvety black. It is possible that the chocolate clypeus is yellow in an earlier stage.

Prothorax yellow, with all deep sutures black. Thorax yellow-green, marked with black as far as the 2nd lateral suture. Metepimeron crimson-red. The black pattern is similar to that of *c. caligata*. It might extend considerably with age. Legs as in *c. caligata*, with broad scarlet-red and white tibiae of the same width as in *c. caligata*.

Abdomen with basic colours as in *c. caligata*, all blue dorsally, all red beneath, except for the narrow black sternites. The dorsal pleurites are pure azure-blue as far as the lateral carinae, and scarlet-red below them. More red than blue shows on the 1st segment, and red shows, when viewed from above, on the sides of 2-4 segments. The penis shows longer alae to the membranous flange to the glans, than in BARNARD's illustration for *c. caligata* in 1937 (*Ann. S. Afric. Mus.*, 32 : 184).

Wings pale yellow at bases and along costa to pterostigma, which is black. There are faint brown edges to the wing-tips.

This single male of a subspecies of the common and widespread *Platycypha caligata caligata* (SELYS), was taken in the S. W. corner of Angola, and a photograph of Ongueria waterfall, shows a rocky gorge and a mountain forest stream. Both sexes of the typical form have been taken in the extreme N. E. at Dundo, where all the rivers flow north to the Congo, and also in three different localities on the Central Angolan watershed plateau. This is a forest-river species, usually found where the water is swift, and I cannot ascertain any significant differences in the habitats of the two subspecies.

The specimen of *P. caligata angolense* seems to be absolutely mature and in perfect condition. It is already known that the genus *Chlorocypha* — from which *Platycypha* is only separated by the widely dilated tibiae — alter the pattern and colouring to a marked degree during one life-cycle. Not only does the black pattern increase — a common enough occurrence in Odonata, due either to age or locality — but the blue on some will begin as a light red, and the pale colours on the head will entirely alter the pattern. Therefore, it may yet be found that a different colour form of the same species occurs before and after the long rainy season (or even at the same time?) I found in Uganda, that my new species of *Chlorocypha tenuis* was a bright green on the sides of the first four abdominal segments in the males, during

February and March in 1934 (1), whereas in November, December and January 1937-38, this colour in the males was only a clear yellow. But the red of the abdomen was brilliant in hue and the insects quite mature to look at. Unfortunately on none of the occasions did I find them actually pairing, but females were present at all times and in all the months. There is a great deal still to learn on the biology and physiology of these attractive dragonflies.

I am naming *P. caligata angolense* with its brilliant crimson and bright chocolate «snout», from *P. c. caligata* with a blue and black one, especially to draw attention to this problem of colour and pattern, constituting, as it seems to do, a far greater change than is normal amongst dragonflies.

### *Chlorocypha glauca* (Selys)

*Libellago glauca* SELYS, 1879, *Bull. Acad. Belg.* (2) 47: 380-381.

The type and two paratype males came from the 13,000 ft. peak, known as Mongo-Ma Lobah, of the Cameroon Mountains, and are distinguished from most others of the genus by having the abdominal segments 1-4 blue and the rest crimson-red. Another unusual character is that the greenish-yellow dorsal thoracic stripes, are very narrow and completely separated (Fig. 4. A.). Laterally are two broad yellowish bands. The black «mushroom» marks on the 2nd abdominal segment are confluent with the black laterally on this segment, or else they are not quite confluent, this being a variable character. Black «mushroom» marks occur also on the 3rd segment, but there are only two tiny black spots on the 4th. The blue pattern on the head consists of four small spots on the frons and a crown-shaped mark, posterior to the vertex. The rest of the head is black, with two minute green postocular spots. The posterior lobe of the prothorax has a narrow blue edge in the centre, and a minute round blue spot either side anteriorly. Except for a trace of yellow at the bases, the wings are hyaline.

This dark-thoraxed mountain form, I propose to name *Chlorocypha glauca glauca* and all the others, known from the low coastal regions, or below 5,000 ft. in altitude, will receive the subspecific name *Ch. g. radix* (?).

### *Chlorocypha glauca radix* subsp. n.

Type male, S. Nigeria, Ado-Ekiti, 19.3.1954, collected by R. M. GAMBLES, who has asked me to describe it. Paratype males — Gold Coast (Ghana): S. Ashanti, Nsuta, 10.6.1913 (J. J. SIMPSON, 1 ♂); Obuassi, — 4.1909 (W. M. GRAHAM, 1 ♂); Cape Coast Castle, two males from the McLACHLAN collection and described doubtfully and erroneously in 1879 by DE SELYS as *rubida* HAGEN. Nigeria: S. Nigeria, Oshogbo, Oshun Bridge, January-March 1913 (H. STRACHAN, 4 ♂♂). Sierra Leone: Yana, 1.4.1912 (J. J. SIMPSON, 1 ♂). All are in the British Museum (Natural History). No female has yet been taken.

Type male has a blue and red parti-coloured abdomen with black pattern similar to *Ch. g. glauca*, but the «mushroom» marks are not confluent with the black laterally on the 2nd segment, and smaller marks of the same character are present on 3-5 segments, while 6 seg. has two tiny black dots. Head marked as in *g. glauca*, but the colour is yellow-green. Epistome black. The prothorax has two tiny blue lateral dots and a broad blue edge to the entire

(1) LONGFIELD, C. 1936, Studies on African Odonata. *Trans. R. ent. Soc. Lond.*, 85:468-470.  
(2) *radix* = the root or bottom of a mountain.

posterior lobe. Thorax with broad greenish yellow dorsal wedge-shaped stripes, completely joined on the «shoulder» near the prothorax. Laterally two broad yellow-green bands (Fig. 4. B.). Legs black, and very dark beneath all the specimen. Wings strongly yellow at base and along costa as far as the nodus.

This insect, in beautifully fresh colouring, is evidently in only a sub-adult colour condition. Three of the four S. Nigerian paratypes are in the blue stage, and the extent of this colouring is as great as in the type. Only one has the dorsal thoracic stripes completely confluent on the «shoulder», in the other three, they are completely, but very narrowly, separated. In the rest of the paratypes, the stripes are joined on the «shoulder» as in the type. In all of them, these dorsal stripes are wedge-shaped, wide and only quite narrowly separated one from another, along their entire length. In all the paratypes, the black «mushroom» marks on the abdomen, extend to the 4th or 5th segments, also the mark on the 2nd seg. is mostly not touching

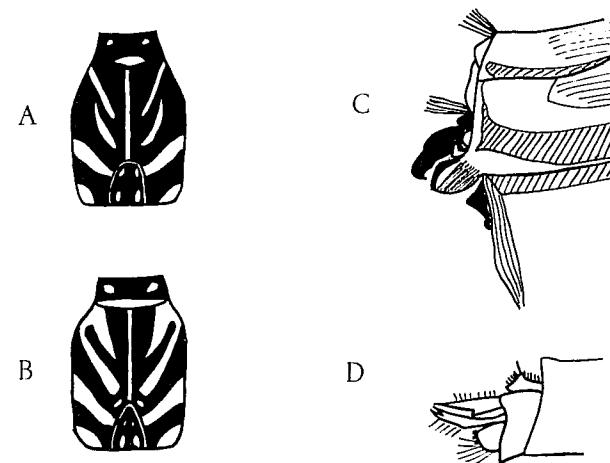


Fig. 4 — Thorax pattern: — A. *Chlorocypha glauca glauca*. B. *Ch. glauca radix* subsp. n. C., genitalia of allotype ♂ *Macromia overlaeti*. D., Anal appendages of the same ♂ from the side.

the black laterally, but in some it just meets at one point. In all, the blue is prominent on the prothoracic lobe, and the yellow tinge of the wings is pronounced as far as the nodus.

This coastal plain subspecies is bluer and more extensively coloured than the mountain form, and above all, it has not necessarily got the dorsal thoracic stripes *isolated* (as in SELYS' type).

### \* II. *Chlorocypha victoriae* (Foerster)

One male from Dundo, and quite typical. This species with an all-red abdomen, can be distinguished from *selysi* (KARSCH) by the blue spots on the head and less black on the 2nd abdominal segment; from *straeleni* FRASER by the difference in the pattern on both head and thorax, and from *curta* (SELYS) by having an all-red abdomen, otherwise being similar in head and thoracic pattern. It is either much less abundant than *selysi*, or else has been mixed with the latter in collections. *Ch. victoriae* is known from Uganda (type locality) and N. Nigeria.



12. *Pbaon iridipennis* (Burmeister)

Two males and five females have the pterostigma well developed, while two males are without it (race *fuliginosus* HAGEN). As collections of *P. iridipennis* usually have a proportion of both sexes without any trace of a pterostigma, also very occasionally a specimen with a reduced Pt., it would appear to be an evolutionary tendency towards complete elimination, which has nothing to do with either locality or season. It is a common African species.

13. *Anax speratus* Hagen

This handsome tawny species has a wide range over most of the African continent, but is more often seen than captured. The three males from Dundo were taken between April and November.

14. *Anax imperator* Leach

This species has usually been known as *mauricianus* RAMBUR, when coming from tropical Africa, but it is now generally conceded that there is no distinguishing it from *A. imperator*, other than by its tropical habitat and life-cycle.

15. *Hemianax ephippiger* (Burmeister)

One female taken in a house in Dundo in December 1947. It may have been on migration at the time, as it is a notorious wanderer.

\* 16. ? *Heliaeschna libyana* Fraser

Two female *Heliaeschna* species, one teneral in May, one adult in October, appear to be referable to this species, described from Uganda. The base of the wings have extensive dark brown rays. The young female has one cercus intact.

\* 17. *Heliaeschna ugandica* McLachlan

A male and female of this species were taken paired in April 1949 at Dundo. This species has hyaline wings, and is known from E. Africa, Uganda and the Belgian Congo. The female has both cerci intact.

\* 18. *Acanthagyna (Gynacantha) sextans* McLachlan

One male from Dundo in December 1948 is a very dark variety of this species, resembling a Gold Coast (Ghana) specimen, with darker head and legs. Neither the type, nor paratype, from the Cameroons, nor the Nigerian specimens, have such deep yellow colouring in the wings, as this Angolan male.

19. *Paragomphus cognatus* (Rambur)

One male taken in Dundo in April 1949, is this species by the genitalia, but considerably differs from the South African specimens by colour and pattern. The oblique yellow antehumeral stripe (7-mark) is joined to the yellow anterior collar. There is also more yellow to the band on the metepisternum. The costal vein of the wing is black (yellow in the S. African). The yellow pattern is reduced on the abdomen and there are no spots on 8-9 segments. The species is quite widespread in South, East and West Africa.

\* 20. *Gomphidia bredoi* Schouteden

A single female from Dundo was captured in October 1948. It is known from several localities in the Belgian Congo, but is new to Angola.

\* 21. *Ictinogomphus regisalberti* Schouteden

A single female of this striking species was taken at Dundo in April 1949. Known from Central and West Africa, but new to Angola.

\* 22. *Phyllogomphus dundomajoricus* Fraser

One male and a female from Dundo, captured in the months of December 1947 and February 1948 belong to a new species that F. C. FRASER has described (and illustrated) in his revision of the genus *Phyllogomphus*, published October 1957 (1).

Although all species in the genus, are exceedingly similar, yet, both in genitalia and pattern this very large new species differs from all the other eight known. The female has the shortest ovipositor of all those known so far, and it does not extend beyond segment 9.

\* 23. *Phyllogomphus dundominusculus* Fraser

A single male, taken at Dundo in November 1948, and smaller than the previous species, has also been described as new by F. C. FRASER, at the same time as the former species (1).

\* 24. *Macromia melania* Selys

A single female would appear to be typical of this species, of which the female is still the only sex known for certain.

(1) FRASER, F. C., 1957, *Rev. Zool. Bot. Afr.* 56:24-29.

\* 25. *Macromia overlaeti* Schouteden

? Synonym *Macromia schoutedeni* Fraser, 1954 (1)

*Macromia overlaeti* was described by H. SCHOUTEDEN in 1934 from one teneral female from the Belgian Congo, with aberrant venation. In 1954 F. C. FRASER described from the same country, a male and two females as *M. schoutedeni*. The male's 10th abdominal segment and anal appendages are illustrated, and shown to be unique in the genus (as so far known), by an inner ventral spine to the superior appendage. The three specimens of *M. schoutedeni* are mature.

FRASER has examined the type female of *M. overlaeti* and says she resembles the females of *schoutedeni*, by the bases of the wings being broadly and deeply saffronated, and tentatively suggests that the «curious venation» may be an aberration. This venation consists of: a single row of cells in discoidal field of forewings; anal-loop with 3 rows of cells and elongate in shape (4 rows and nearly quadrate in *schoutedeni*); yellow on the upper surface of frons and side of face (ferruginous and blue metallic in *schoutedeni*), (*ibid*, 1954, 73-74).

At Dundo, in August 1948, two males and one female were captured. All three are teneral. Both males have the 10th segment and anal appendages, as FRASER has drawn for the type of *schoutedeni*. The female has the yellow face of *overlaeti*, and all three show a mixture of the characters of both species. Male *a* has one row of discoidal cells for five rows in both forewings. Male *b* has one cell for six rows in the left forewing and two rows in most of the right forewing. The female has one row of discoidal cells in both forewings. She also has four rows of cells in a quadrate anal-loop in the right hindwing, and an almost elongate (but asymmetrical) anal-loop in the left hindwing, with 2 rows of 3 cells, 1 row of 4 cells and 1 row of 2 cells. The female, with the exception of the right hindwing anal-loop, is similar in all respects to the female type of *overlaeti*. The males, except for the venation in the forewings, and differences in colouring due to their less mature ages, are similar to *schoutedeni*. There can be little doubt that these are one and the same species, and the name *overlaeti* takes priority. As the male of *M. overlaeti* has not been described, I am selecting specimen *a* of the Dundo males as allotype. Type male and paratype female are now in the British Museum (Natural History).

Allotype male, N. E. Angola, Lunda Province, Dundo August 1948 (Fig. 4. C-D.). The teneral insect is squashed and a little broken, but nothing vital is missing and the wings and genitalia are entire. Abdomen 38 mm. Hw. 30 mm. Head: beneath sandy-brown; labium greenish yellow with a brown centre, the mouth parts a light red-brown; labrum uniform reddish brown; clypeus olivaceous-brown; frons pale olivaceous-yellow; vertex deep violet-blue metallic; the ocelli, a very small occipital triangle and first three basal joints of the antennae dark brown, end joints of the flagellum pale sandy-brown. Legs: Coxae pale greenish yellow, but with a dark brown mark along the outer muscle on the mid- and hindleg. Trochanters on forelegs greenish yellow, but mahogany-brown on mid- and hindlegs. Femorae on forelegs with a yellow base shading into mahogany-brown, all the femorae mahogany-brown on mid- and hindlegs. Forelegs with two rows of long black hairs and one row of spines on anterior edge of inner surface, the outer surface quite smooth. Midlegs with inner surface with three rows of short spines and two rows of longer and denser black hairs alternating with spines, outer surface with one row of spines and one row of hairs. Hindlegs with inner surface with two rows of very short but closely placed black spines, outer surface with one row of spines and a double row of short, fairly sparse black hairs. Tibiae of forelegs with inner surface with two rows of widely spread, long and irregularly spaced spines and two rows of long fine hairs

between. Near the tarsal end there is a chitinous keel, for a little more than one-third of the length of the tibia and a strong tibial comb for one-fourth of the length. Outer surface with two rows of very tiny hooks. Midlegs, inner surface without a chitinous keel, but with two rows of shorter and rather more regularly spaced spines, with one row of fine hairs between. Outer surface with two rows of very short hooks. Hindlegs with inner surface with two rows of long black spines, nineteen on posterior edge, fourteen on anterior, between them an elevated transparent chitinous keel, the whole length of the tibia. Outer surface with two rows of very short black hooks. Tarsi of all legs with inner surfaces with two rows of fairly long stout spines, closely grouped together and with some long fine hairs between. Outer surfaces smooth. Claws long, reddish and with the lower tooth almost as long as the claw. Hind femur 10 1/2 mm. Hind tibia 9 mm. Prothorax and thorax: the greater extent, especially beneath, pale greenish yellow. On the dorsum and sides are broad areas of brown, shot through with violet-blue-green metallic colouring. These areas cover the whole episternum to the ante-alar sinus, except for a narrow line along the mid-dorsal carina, and two broad yellow antehumeral stripes. Laterally the brown-metallic colour covers the mesepimeron from the humeral suture to the 1st lateral suture, and a broad band across the metapleurum covers the 2nd lateral suture, one-third of the width on the metepisternum and two-thirds on the metepimeron. The band divides each side of the metinfraepisternum, leaving this yellow, but a wedge of metallic colour continues underneath, almost meeting across the sternum just below the hindlegs.

Wings: tinged with pale yellow, especially along the costal area between the Nodus and Triangle, and in the anal area. There is a very small trace of saffron close to the body. Membrane large, white, shading to brown along the inner edge against the wing-base. Venation black or very dark brown. Pterostigma a uniform matt grey-brown, in forewing 2 1/2 mm. long + 1/2 mm. wide, hindwing 2 mm + 1/2 mm., covering the equivalent of two cells, but with only one cell entirely covered. Pt. basal vein rectangular, but apical vein sloping to a point along the costa. Nodal index:  $\frac{6}{9} \frac{15}{10} \frac{16}{11} \frac{6}{8} \frac{Hts}{2} \frac{3}{2} \frac{3}{2} \frac{ca}{2} \frac{(cuq)}{3} \frac{5}{3} \frac{T}{3}$  and *ti* free. *Arc* just basad

to 2nd *An*. Sectors of *arc* joined for a long way. Discoidal field: Right fw. 5 ones, 4 twos, 1 three, 3 fours, then a jumble of small cells with 10 at the wing border; left fw. 5 ones, 4 twos, 1 three, 2 fours, then a jumble and 8 at the border; right hw. 2 ones, 2 twos, 2 threes, a jumble and 10 at the border; left hw. 5 twos, 2 threes, 2 fours, a jumble and 8 at the border. Abdomen: light nigger-brown generally, especially on dorsum, but pale yellow at most joints and more extensively beneath. Segments 1-3 the yellowest. The posterior dorsum of seg. 1 with long, dense, cream-coloured hair, but segment shading to brown beneath it. Seg. 2 with the dorsum of posterior half brown, extending well down the sides, the dorsum of the yellow anterior half has the same long, dense cream hairs. Seg. 3 with a basal anterior yellow ring, and a posterior yellow ring to the anterior half, yellow at the lower ventral edges and beneath, the rest of the segment brown. Segments 4-6 similar, the anterior half much yellower than the posterior half. Seg. 7 with only half the anterior half yellow, but forming a band right round the segment. Segments 8-10 with irregular patches of yellow on the sides. Dorsal boss on 10, and superior anal appendages brown, most of the inferior anal appendage yellow. The 10th segment has a stout «boss» on the centre dorsum, slightly angular in sideview and with a centre spike of stiff hair. The superior appendages taper to a point and curve slightly outwards. There is a stout spine-like projection ventrad, at half the length. The inferior appendage has a bifid end, slightly upturned at the tips. FRASER's illustrations in Fig. 1, 2-3 (1954, p. 48) are the same.

Paratype male *b*, Dundo, August 1948. Differs from the type as follows: Frons, as well as vertex, showing considerable metallic-blue. Wings very faintly tinged pale yellow. Nodal index:  $\frac{6}{8} \frac{14}{11} \frac{15}{10} \frac{6}{8} \frac{Hts}{2} \frac{3}{2} \frac{4}{2} \frac{ca}{2} \frac{5}{3} \frac{5}{3}$  Discoidal field: Right fw. 2 twos, 1 one, 3 twos, 2 threes, 3 fours, 9 cells at border; left fw. 6 ones, 4 twos, 1 three, 2 fours, a jumble and 8 cells at border; right hw. (centre broken), 10 cells at border; left hw. 3 ones, 2 twos, 2 threes, 2 fours,

(1) FRASER, F. C.. 1954. *Rev. Zool. Bot. Afr.* 49:52.

a jumble and 8 cells at border. Abdomen: rather more brown dorsally and more yellow laterally and below. Yellow round nearly every joint, also segments 1-2 and 7 with complete yellow transverse bands, and seg. 10 mostly yellow, but dorsal «boss» brown.

Paratype female, Dundo, August 1948. Head: Labium, genae, labrum ochre-yellow; clypeus and frons olivaceous-yellow, the latter showing traces of violet metallic. Thorax entirely tawny-yellow with a few markings: narrow cream antehumeral stripes and cream dots on terga; two cream diagonal bands laterally, one beneath each wing. Legs: tawny-yellow and black, the femorae being mostly yellow. Wings: bases brilliant golden-yellow extending from costa to border, as far apicad as just beyond the 6th antenodal vein. Abdomen: mostly tawny-yellow, with traces of cream spots on segments 1-3, black marks dorsally on segs. 4-10, but anterior half of seg. 7 would appear to be yellow. All transverse carinae broad and black. Cerci short, conical, very pointed, brown with black tips. Epiproct yellow. Measurements: Abd. 37 mm. Hw. 35 mm.

\* 26. *Urothemis assignata* Selys

One female of this quite common species was taken at Dundo in May 1949, being new to Angola. The specimen is very mature.

\* 27. *Hadrothemis defecta* Karsch

One adult male in August 1948, one teneral female in October 1946 and one adult female in March 1949, all from N. E. Lunda Province. The species is found in East, Central and West Africa, but was previously unknown from Angola.

28. *Brachythemis leucosticta* (Burmeister)

About the most abundant species to be found in general collections from Africa, the ten males and thirty-one females in the Dundo collection, all came from S. W. Angola, none from Dundo itself. One female, captured 7.10.1949, shows faint banding of the wings, as in the male.

29. *Ortbetrum abbotti* Calvert

30. *Ortbetrum caffrum* Burmeister

31. *Ortbetrum brachiale* (P. d. Beauvois)

32. *Ortbetrum guineense* Ris

33. *Ortbetrum microstigma* Ris

34. *Ortbetrum chrysostigma* Burmeister

\* 35. *Ortbetrum machadoi* Longfield

\* 36. *Ortbetrum austeni* (Kirby)

\* 37. *Ortbetrum julia* Kirby

\* 38. *Ortbetrum icteromelas* Ris

\* 39. *Ortbetrum hintzi* Schmidt

\* 40. *Ortbetrum falsum falsum* Longfield

These species were all dealt with in Part I, (1955). The last species was only taken in S. W. Angola.

41. *Nesciothemis (Ortbetrum) farinosum* (Foester)

Also dealt with in Part I, (1955).

\* 42. *Aethiothemis diamangae* sp. n.

Holotype male, Dundo, Lunda District, N. E. Angola, March 1949. This single male is a teneral and a very yellow insect, marked with black, a little smaller than *Ortbetrum abbotti* and very similar in appearance. It has, however, the R3 vein barely curved up once, and then turning steadily down to the wing border. There are also two cell rows for a good part of the length in the discoidal field (but three cell rows are not always a constant character in *O. abbotti*). Measurements: Abd. 21 mm. Hw. 24 mm.

Head: Labium and labrum chrome-yellow, the rest of the face yellow-green, with a wide brown base-line to the frons and extending down the sides; vertex shiny blue-black (very slightly metallic); occiput shiny brown; rear of head chrome-yellow, with black in occipital foramen.

Prothorax: Chrome-yellow, with two large wedge-shaped black spots on centre lobe, the wedge points towards the centre, but not meeting; a wide black band in the suture of the anterior lobe.

Thorax: Dorsum chrome-yellow with a black centre V; wide black antehumeral stripes and black humerals fused at the base to the former, the two yellow bands these stripes enclose are slightly narrower than the black. Laterally ivory-white and shiny, with a faint indication of very pale yellow to follow. The only black stripes laterally, are as follows: a short one along the 1st lateral suture to stigma, and a narrow complete one along the 2nd lateral suture. Pale beneath, with two long pear-drop black marks and a posterior centre black spot. Legs: Yellow coxae and trochanters. Fore-femorae beneath all yellow, only a yellow streak beneath the mid- and hind-femorae. Upper surfaces of femorae and all tibiae and tarsi black.

Wings: Hyaline, with black longitudinal veins and yellow cross-veins. Saffron-yellow basal patches just reach the first anal vein in forewings, and the ac in hindwings. Pt. pale fawn, covering two cells, the costal edge thick and black, 3 mm. long + 0.8 mm. wide. All triangles

free. *Ac* under 1st *An*. *Arc* at 2nd *An* in forewing and well apical in hindwing. Anal loop of 11 cells and reaching wing border. Nodal index  $\begin{matrix} 6 & 9 & 10 & 6 \\ 7 & 8 & 8 & 7 \end{matrix}$  Discoidal field: forewings 2 cells, then 3, etc; hindwings: four rows of 2 cells, then 3, etc. One cell-width anal field forewing, two cell-width in hindwing.

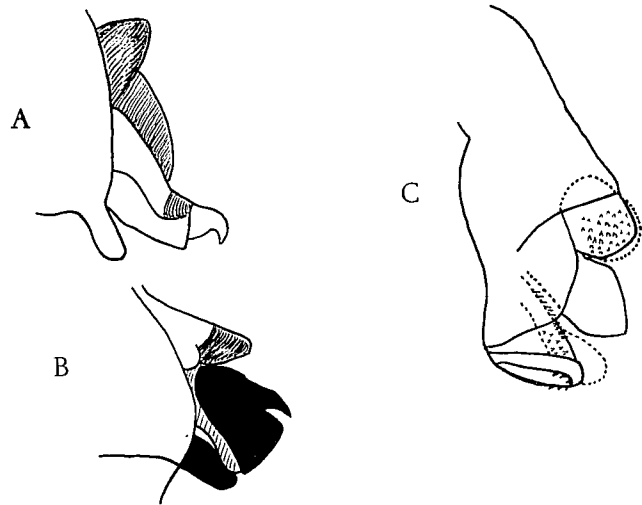


Fig. 5 — Genitalia of Type ♂: — A., *Aethiothemis diamangae* sp. n. B., *Oxythemis gamblesi* sp. n. C., Penis of *O. gamblesi* copied from R. M. GAMBLES in lit.

Abdomen: Black and yellow. Dorsally mostly black, the yellow showing each side in the centre of each segment. All yellow laterally, with black across each segment joint. Black and yellow beneath. Superior appendage black, inferior appendage mostly yellow. The secondary genitalia are not unlike FRASER's *A. basilewskyi*, but with a much reduced *OH* to the hamule. The genitalia is distinctly *Lokia*-like (Fig. 5. A). The insect is slim, and resembles a small species of *Trithemis*. I have named it after the diamond mine at Dundo.

### *Oxythemis gamblesi* sp. n.

Three males taken by R. M. GAMBLES in the Nigerian coastal belt and more seen, all in swampy flooded country, beside the rivers. These rivers were the Ogun, Osse, Okhuniwa and Okhi, all between the latitudes 6° 20' N. and 6° 40' N., and longitudes 3° 25' E. and 6° E. Mr GAMBLES says (*in lit.*) that it must be fairly common as he saw several in such a wide stretch of country, in different years, and that it is easy to recognize while settled. The species must be extremely close to *O. phoenicosceles* RIS, the type species of the genus. Both have identically red-coloured legs. There are, however, considerable differences in the colour-pattern and structure of the genitalia.

Holotype male, Nigeria, Ogun River delta, near Ikorodu, 26.2.1956. A fully mature insect, as there is a certain amount of pruinosity in parts. Total length of insect 37 mm. Abd. (including appendages 1.6 mm.) 24 mm. Hw. 25 mm.

Head: Labium and inner half of the lateral lobes black, outer half yellow. Labrum anterior half black, the rest of labrum, genae, post- and ante-clypeus yellow. Frons blue-grey, a wide black base-line. Vertex shiny blue-black, very slightly metallic. Occiput wide and mahogany-brown. Rear of head and eyes black.

Prothorax: Black laterally, yellow dorsally, with a high, upturned anterior and posterior lobe, the latter edged with dense, long, fine black hairs.

Thorax: A moderately wide yellow band dorsally (no black dorsal carina), and on either side a black wedge twice the width of centre yellow, and wider near the forelegs than posteriorly. This black slightly overlaps the humeral suture. Laterally, the forward half of mesipimeron yellow, rear half to 1st lateral suture black. A crescent-shaped yellow spot below stigma, and a long oblique yellow mark on the mesinfraepisternum. The metapleurum shows a wide yellow band just posterior to 2nd lateral suture and the rest is black, but obscured by blue-black pruinosity (also beneath).

Legs: Forelegs entirely black. Mid- and hindlegs with orange-red femorae, banded with black at either end. Tibiae and tarsi all black, also trochanters, but coxae? yellow (pruinosed blue-black).

Wings: very faintly yellow-tinted, and with the apex faintly brown. Venation black; membrane black. A very small amount of basal amber, barely to first cross-vein in hindwing and a trace in forewing. *Pt.* red-brown, 2 mm. fw., 2.5 mm. hw. by 0.7 mm. wide, covering a little more than 2 cells. Anal loop of 15 cells in right hindwing, and 18 in left hw. *Cu2* well curved, wide at *T* in fw. and very wide in hw. Forewing *T*'s crossed, *Ti* 3-celled in right and 2-celled in left forewing. *Ht*'s free. Nodal index  $\begin{matrix} 11 & 12 & 11 & 9 \\ 9 & 9 & 9 & 10 \end{matrix}$  Discoidal field in forewings: 3.2.2.2.3.3.3. etc. *Arc* basal to 2nd *An* in both forewings, and just apical in both hindwings.

Abdomen: Segments 1-3 reddish brown (crimson-red in places) and deeply enlarged dorso-ventrally. Sharply narrowed at posterior end of 3 and coloured black from there to anal appendages inclusive, but with some orange-yellow beneath 7-10, showing laterally as a round patch on 10. Anal appendages long, pointed, and three times the length of seg. 10, and longer than 9 (1.1 mm.). Inferior appendage with obtuse tip slightly upturned. The secondary genitalia seem nearest to *Aethiothemis solitaria* MARTIN (the type species of the genus *Aethiothemis*) and also resemble those of *Oxythemis (Aethiothemis) carpenteri* FRASER. Distinguished from *solitaria* by the larger, curved *AL*, and the straight hook to the hamule, in place of a very curved one. Distinguished from *carpenteri* by the latter character and by a squarer outline to the *OH* (rounded in *carpenteri*). Distinguished from *O. phoenicosceles* by the larger and squarer *OH* and the shorter and stouter hook to the *IH*; also the lobe is narrower. (Fig. 5. B & C).

Paratype male, Nigeria, River Okhuniwa, Ohuma, near Ugonoba, 20.3.1954. A non-pruinosed insect, but otherwise very similar to the type. The following are the differences: head with less wide black on labial lateral lobes; legs with black coxae; thorax blacker and the two lateral yellow bands slightly wider; all the thorax black between the yellow bands and also the entire metepimeron, and beneath; abdomen with less red on segs. 1-3 and red, in place of orange-yellow, beneath 7-10, and showing laterally as a narrow streak.

Wings: as in type for colouration. Nodal index  $\begin{matrix} 11 & 13 & 12 & 10 \\ 11 & 10 & 9 & 10 \end{matrix}$  Discoidal field right fw. 3.2.2.2.2.2.3.3.3. etc., left fw. 3.1.2.2.2.2.3.3.3. etc. *Arc* left fw. just apical to 2nd *An*, right fw. at 2nd *An*, both hws. between 2-3 *Ans*. Anal loop of 18 cells. *Cu2* moderately flat in forewings and wide at corner of *T*, very wide in hindwings. Total length 36.5 mm. Abd. 24 mm. (superior appendage 1.6 mm). Hw. 26 mm. Type and paratype in British Museum (Natural History). A paratype male in GAMBLES' collection (from same locality and date as type).

shows a nodal index of  $\begin{array}{c|c|c|c} 11 & 12 & 13 & 11 \\ \hline 12 & 10 & 9 & 12 \end{array}$  Measurements: Total length 37.4 mm. Abd. 23.4 mm. (superior appendage 1.8 mm). Hw. 27 mm.

The characters that originally divided the genera *Aethiothemis* and *Oxythemis*, were moderately good enough, when only the types of the two genera were known.

<i>A. solitaria</i> RIS (in MARTIN) 1908	<i>O. phoenicosceles</i> RIS 1909
Fw. 10 <i>Ans</i> or less	Fw. 11 <i>Ans</i> or more
<i>Cu2</i> distinctly curved	<i>Cu2</i> rather straight
No red on legs	Half of mid & hind legs red
Abd. short & depressed	Abd. slim & relatively long
Frons & vertex non metallic	Frons & vertex partly metallic
Anal loop 13 cells	Anal loop 13 cells
Fw. T's crossed	Fw. T's crossed

The secondary genitalia in both resembles partly the genus *Hadrothemis*, and partly the genus *Orthetrum*.

In 1912 MARTIN described *Aethiothemis palustris*, very distinct by its coloured wings. With 9-10 *Ans*, non-metallic vertex, depressed abdomen, crossed forewing T's and no red on the legs, it conformed to the generic characters. It also closely resembled *solitaria* in genitalia. It had, however, 15-16 cells in the anal loop.

In 1919 RIS added to *Aethiothemis* the species *bequaerti*, with a long and slim abdomen, forewing T's un-crossed, black legs, and the secondary genitalia *Lokia*-like. It also had an anal loop of 15-16 cells. FRASER (1954) placed this species in a new genus *Nubiothemis*, as it did not conform to the *Aethiothemis* characters or facies. However, since then, more species of both genera (or the same?) have become known.

In 1931 RIS described *Aethiothemis mediofasciata* from one female. He says she has the wing venation of the male type of *solitaria*, but is unlike the female that he later ascribed to that species. However, there is distinctly a doubt that this specimen, and the male taken with it, is correctly named as *A. solitaria*. There is, therefore, a possibility that *mediofasciata* is really *solitaria*.

In 1944 FRASER described *Oxythemis carpenteri*. It has 10-11 *Ans* in forewing, 13 cells in anal loop, forewing T's crossed, slim abdomen, non-metallic frons and vertex, no red on legs, *Hadrothemis*-like genitalia and curved *Cu2*. On balance it most resembles an *Oxythemis*, but is nearer *A. solitaria* in genitalia.

In 1949 FRASER described and illustrated *Oxythemis villiersi*, but this is far more likely to have been *Orthetrum abbotti* CALVERT, the genitalia figured being identical and this species of *Orthetrum* often closely resembling *Oxythemis* in venation.

In 1954 FRASER described *Aethiothemis basilewskyi* with a very metallic frons and vertex, only 10 complete *Ans* in forewings, short, depressed abdomen, *Lokia*-like genitalia, forewing T's uncrossed. This species, therefore, closely resembles *A. bequaerti* in venation and genitalia, but has a metallic frons, so far known only partially from the genus *Oxythemis*. If *Nubiothemis* is considered a good genus, then *A. basilewskyi* should be placed in it. FRASER's *Aethiothemis paludinis* (1954) is altogether too indefinite (without any illustration of the genitalia) to be taken into consideration in this analysis. However, it has a non-metallic frons, 13-14 *Ans* (which would place it in *Oxythemis*), is long & slim, and with black legs. Also in 1954 FRASER described *Oxythemis aequatorialis*, with non-metallic vertex, 13 *Ans* in forewings, T's crossed in forewings, black legs and *Orthetrum*-like genitalia.

I now describe, one species that I have placed in *Aethiothemis* and one in *Oxythemis*. I am quite sure that *A. diamangae* is nearer to the type of the genus — *solitaria* — than to the

type of the genus *Oxythemis* — *phoenicosceles* — but it has genitalia closely resembling those of *Aethiothemis* (? *Nubiothemis*) *basilewskyi*; with uncrossed T's as in that species and *bequaerti*, 9-10 *Ans* in forewing and an anal loop of 11 cells. *Oxythemis gamblesi*, on the contrary, is so like the description of *O. phoenicosceles*, that I hesitated before naming it a new species. Yet its genitalia most closely resemble those of *Aethiothemis solitaria*, and the anal loop is of 15-18 cells, only *bequaerti* and *palustris* having as many.

On all this evidence, it seems as if the generic characters are difficult to hold to, and that it might be better simply to make the three genera involved, into «groups» of *Aethiothemis* (which name has priority).

\* 43. *Elutbemis buettikoferi* Ris

One female taken at Dundo in March 1949, is referable to this species. Originally described from a single male taken in 1880 in Liberia, the species has been exceedingly scarce in collections up to the present time, although now known from Sierra Leone, Portuguese Guinea, North & South Nigeria and Rhodesia, where it has lately been taken near the Victoria Falls in some numbers.

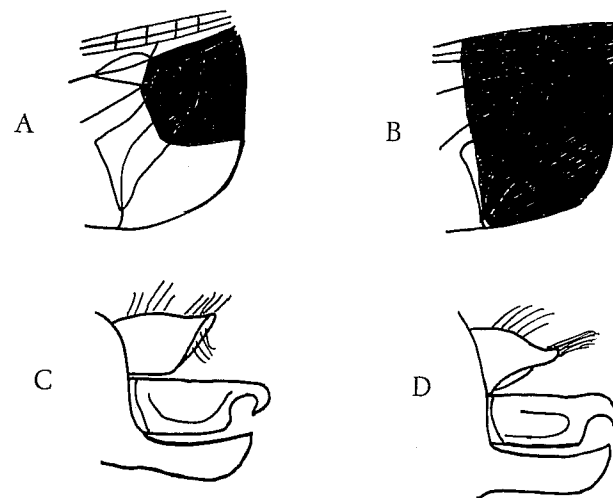


Fig. 6 — Hindwing base pattern: — A., *Trithemis arteriosa*. B., *T. monardi*. Male genitalia: — C., *T. arteriosa*; D., *T. monardi*.

44. *Trithemis arteriosa* Burmeister

The most abundant species of *Trithemis* in Angola and probably also in all the African Continent. It has sometimes been confused with the next species, *T. monardi*, as the genitalia and appearance are very similar, especially in immature colouration. With a large series of both species, fully mature in April at Dundo, it was easy to distinguish the two, and I have illustrated the characters that can be relied on (Fig. 6).

45. *Trithemis monardi* Ris

The next most abundant Angolan *Trithemis*, and flying with *T. arteriosa*. The species is also known from South and S. E. Africa.

\* 46. *Trithemis dicbroa* Karsch

This species, previously unrecorded for Angola, seemed to be fairly abundant at Dundo. It is the smallest and the blackest of the species in Africa and quite common in the Congo and other western regions.

\* 47. *Trithemis nuptialis* Karsch

Two males of this species were taken in different years in southern Angola. Never common in collections, it could easily be passed over as «just another indigo-blue one». Found in East, Central and West Africa generally.

48. *Trithemis risi* Longfield

Only two males of this, usually, very common species, came from Dundo. Perhaps it is passed over, like the previous species, or maybe it is not plentiful in Angola, although a few have been taken in many localities in the south of the country.

\* 49. *Trithemis donaldsoni* Calvert

Two females of this species came from Dundo, and were new to Angola. The species is not very common anywhere, but is widespread in Africa.

\* 50. *Crocothemis divisa* Karsch

A few males and females were taken at Dundo. This is the least abundant of the African species of the genus.

51. *Crocothemis sanguinolenta* Burmeister

A few of both sexes of this species were taken at Dundo in most seasons, but evidently it is commonest in south Angola. A very common and widespread African species.

52. *Diplacodes lefebvrei* Rambur

Two males only from Dundo, and evidently scarce in Angola. It is common and widespread in the eastern and southern parts of Africa, but not so abundant in either the western or central regions.

53. *Acisoma panorpoides ascalapboides* Rambur

Two males only of this common and widespread subspecies of an Asian species, were taken at Dundo. It is not easy to net, owing to its keeping so near the water surface.

\* 54. *Aethriamanta rezia* Kirby

Three males and a female from Dundo, June 1949, are the first recorded from Angola. The species is usually rare in collections, mostly because it is difficult to catch. It is really quite widespread, being known from several of the south-eastern, central and western African countries.

55. *Palpopleura lucia* f. *lucia* Drury

*Palpopleura lucia* f. *portia* Rambur

These two forms of one very abundant and widespread African species, were taken in almost equal quantities at Dundo from January to June.

It is still not satisfactorily decided what exact taxonomic status they should occupy. There is some proof, in part of their range, that they occupy different altitudes, but in many parts this does not hold good. It might be that the larvae occupy different types of waters, but the adults, however, definitely frequent the same ponds and puddles. They cannot be different seasonal forms, but may still prove to be two different species.

56. *Zygonyx (Pseudomacromia) flavicosta* Sjöstedt

It is agreed that the African genus *Pseudomacromia* is identical with the Asian *Zygonyx* which has priority of name. Few specimens of these large, strong flyers are usually seen in collections, owing to the habit of the adults of flying over rapids and in the spray of waterfalls. Two males and a female were taken at Dundo in August 1948. It is essentially a Congo and West African species.

\* 57. *Zygonyx torrida* Kirby

This would seem to be the most abundant and widespread species in Africa, but the four males from Dundo are the first recorded from Angola. The next commonest African species of *Zygonyx* — *natalensis* MARTIN — was taken in the south of Angola, but does not appear in the Dundo collection.

\* 58. *Zygonyx speciosa* Karsch

One male from Dundo in April 1949, is new to Angola. It is also a Congo and West African species.

\* 59. *Zygonyx eusebia* Ris

One female of this beautiful species has very brilliant golden and brown patterned wings. Previously I only knew of the species from the Belgian Congo.

\* 60. *Zygonyx regisalberti* Schouteden

Three females of this magnificent species were obtained at Dundo, in different years and months. The amount of gold and brown on the wings varies considerably in all three.

61. *Pantala flavescens* Fabricius

Four males and five females of this great wanderer were taken in different months and years. Those captured in the autumn were no doubt on migration.

S U M M A R Y

61 species of Odonata (Dragonflies or Libellules) are listed from Dundo, Lunda, N. Angola and their distribution in Africa is discussed. Three new species and one new sub-species are described, and altogether 34 species have here been added to the list of species known from Angola, which now numbers 113. Studies were made on the *Pseudagrion* of the *angolense* group; on some species of *Chlorocypha* and *Platycypha*; on two species of *Macromia*; on the genera *Aethiothemis* and *Oxythemis*.

At the same time, two new species and one new sub-species from Nigeria are here described.

I Pterostichini e Melanchitonini dell'Angola  
(Coleoptera, Carabidae)

I Nota supplementare

PER

S. L. STRANEO

(GALLARATE, ITALIA)